



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/785,477      | 02/20/2001  | Hiroki Kanai         | 520.39648X00        | 5481             |

24956 7590 09/01/2005

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.  
1800 DIAGONAL ROAD  
SUITE 370  
ALEXANDRIA, VA 22314

EXAMINER

CHACE, CHRISTIAN

ART UNIT PAPER NUMBER

2189

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/785,477

Applicant(s)

KANAI ET AL.

Examiner

Christian P. Chace

Art Unit

2189

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2005.  
2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 19-23 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 19-23 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

This Office action has been issued in response to amendment filed 11 July 2005. Claims 19-23 are pending. Applicants' arguments have been carefully and respectfully considered in light of the instant amendments to the claims, but they are not persuasive. Accordingly, this action has been made FINAL.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 19-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With respect to independent claim 19, a first disk controller receiving from a host *each* write request for the data in the disks of a second disk controller does not appear to be in the disclosure as originally filed. (emphasis added).

Applicants are required, in response to this Office action, to point out exactly and clearly where in the originally filed disclosure the italicized element *supra* is disclosed, if it is, indeed, disclosed.

Claims 20-23 depend upon claim 19 and are rejected for at least the reasons set forth supra with respect to same.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 19-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Otterness et al (US Patent #6,460,122).

With respect to independent claim 19, a storage system is disclosed in the title.

A plurality of clusters is disclosed in figure 11 as Complex/Controller A and Complex/Controller B, with each being a cluster. Examiner notes that the figure shows both controllers to be labeled as "A." However, examiner interprets this as a typographical error in the patent, and interprets the second controller as "B."

A communication path which connects each of the clusters is disclosed in figure 11 as "Communications Fibre Loop."

A disk controller (in each cluster) is disclosed as Processor Complex A or B, respectively.

A plurality of disk drives is disclosed in figure 11 as the disk drives shown connected to the disk fibre loop in each of the clusters.

A disk interface in each of the disk controllers which connects to the disk drives of the cluster is shown in figure 11 as the “disk fibre loop.”

A cache memory is disclosed in figure 11 as DATA caches in the processor complexes.

A control memory is inherent in light of the disclosure at column 23, lines 7-8, which discuss cache control firmware. Inherently, if there is cache control firmware, there must be a place to store it. That place to store it is interpreted by examiner to be a control memory. Storing a cache management table, wherein said cache management table indicates “relationships between identifications of disk controllers, addresses of disk drives connected to the disk controllers, and addresses in the cache memories at which data of said disk drives are stored,” is disclosed in column 9, lines 22-27; column 10, lines 44-67; column 11, lines 1-6, 15-18, and 36-45; column 12, lines 1-3, 12-16, and 34-38; as well as in table I, “1\_blk, cache level, and data addr.” It is also noted that the disclosed hash tables could also read on this management table the way it is claimed (relationships), although they are not *explicitly* disclosed as being in the control memory, necessarily – they are not disclosed as being stored in any particular physical or logical location.

Examiner also notes that all of the above is disclosed in applicants’ admitted prior art figure 17 of the instant disclosure, as well.

“Updated data” is given its broadest reasonable interpretation by examiner to be data. During a write operation, any data written could be considered “updating data” as it is writing “newer” data to that area of memory.

When a first disk controller of a first cluster receives from a host computer each write request (shown, as applicants point out in the instant remarks at page 11, as figure 13), requesting to update (write) data stored in disk drives of a second disk controller of a second cluster is shown in figure 13, #703, where the first controller checks all other controllers to check for data in it's cluster (for disk access reasons, as disclosed in #707 of figure 13. The first disk controller checking whether the data is stored in the cache memory of the second disk controller by referring to the cache management table (see supra), and if the data is not stored in the cache memory of the second disk controller, the first disk controller sending the write request to the second disk controller via the communication path is disclosed in figure 13 as step #704, where the first controller checks other controllers to see if this data (the "data to be updated") is there. If it is not there, the process passes to #707 in figure 13, where it is determined that another controller has the data, and then to #705, where the data is demoted to the appropriate controller.

Figure 13, steps #703, #704, #705, and #707 also anticipate, as discussed supra, that, in response to the write request from the first disk controller (#704) and when the data to be updated is not stored in the second disk controller's cache (#704 – line to #707), the second disk controller writes the data to the disk drives of it's cluster via the disk interface based on the write request (for disk access reasons in #707, process passes to #705, where data is demoted to appropriate controller.

All of this process is also discussed from column 25, line 65 into column 26, line 50. It is important to note that "demotion" is writing back data to what is, in fact, known

in the art as a lower-level cache, such as the actual disk, as is discussed in column 4, lines 45-65, for example, but is referred to by Otterness et al as "higher" level caches, which, ordinarily, would be closer to the processor, not farther away.

With respect to claim 20, the data is stored in the cache of the second disk controller, the second disk controller updates the data by writing the data into the second disk controller cache is disclosed in figure 13, #705.

With respect to claim 21, each control memory of the clusters storing a cache directory to identify the disk controller having a disk drive which stores the data in that cache memory is disclosed in figure 6, #514, which shows the mapping of cache lines of system drive sectors. Column 15, lines 40-43 discusses the hash table shown in figure 6, and how it allows the cache control firmware (inherently stored in the control memory) to perform a quick look-up to determine if the data is already cached [or in the disk].

With respect to claim 22, the first disk controller receiving a completed report indicating completion of the writing of data from said second disk controller, and thereafter sending the completed report to the host computer is disclosed in figure 13, #706.

With respect to claim 23, the second disk controller inhibiting access to the data until the first disk controller sends the completed report is shown in figure 13, as no activity is shown to happen from #705 (where the data movement is complete) to #706.

***Response to Arguments***

With respect to applicants' arguments that the cited prior art does not teach or suggest the added claim limitations, examiner respectfully disagrees, and refers applicants to the rejection of same supra.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian P. Chace whose telephone number is 571.272.4190. The examiner can normally be reached on MAXI FLEX.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571.272.4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'C. P. Chace', with a long horizontal line extending to the right.

Christian P. Chace  
Primary Examiner  
Art Unit 2189